



**Jahangirnagar University**  
**Department of Computer Science and Engineering**  
3<sup>rd</sup> Year 2<sup>nd</sup> Semester B.Sc. (Hons.) Final Examination - 2022

Course Title: Management and Accounting  
Time: 3 hours

Course No: CSE-351  
Full Marks: 60

[All questions are of equal value. Answer any **Four (4)** questions. All parts of each question must be answered consecutively. Figures in the right margin indicate marks of a question.]

1. a) What is management? To be manager, what kind of skills should a person have? 5
- b) Describe the kinds of managers found at different levels and in different areas of the organization. 5
- c) What is planning? Who are generally responsible for planning in the organization? Explain. 5

- ✓ 2 a) Ms. Iram opens her own law office on July 1, 2011. During the first month of operations, the following transactions occurred.
- i. Invested Tk. 10,000 in cash in the law practice.
  - ii. Paid Tk. 800 for July rent on office space.
  - iii. Purchased office equipment on account Tk. 3,000.
  - iv. Provided legal services to clients for cash Tk. 1,500.
  - v. Borrowed Tk. 700 cash from a bank on a note payable.
  - vi. Performed legal services for client on account Tk. 2,000.
  - vii. Paid monthly expenses: salaries Tk. 500, utilities Tk. 300, and telephone Tk. 100.

**Instructions:** a) Prepare a tabular summary of the transactions. 5

b) Prepare the income statement, owner's equity statement, and balance sheet at 10  
July 31 for Ms. Iram, Attorney at Law.

- ✓ 3 Bobby Sample opened the campus Laundromat on September 1, 2008. During the first month of operations, the following events occurred.
- Sept. 1 Invested Tk. 20,000 cash in the business
- Sept. 2 Paid Tk. 1,000 cash for store rent for September
- Sept. 3 Purchased washers and dryers for Tk. 25,000, paying Tk. 10,000 in cash and signing a

Tk. 15,000, 6-month, 12% note payable.

Sept. 4 Paid Tk. 1,200 for a one-year accident insurance policy.

Sept. 10 Received a bill from the Daily /news for advertising the opening of Laundromat Tk. 200.

Sept. 20 Withdrew Tk. 700 cash for personal use.

Sept. 30 Determined that cash receipts for laundry services for the month were Tk. 6,200.

**Instructions:**

- a) Journalize the September transaction 6
- b) Open ledger accounts and post the September transactions 3
- c) Prepare a trial balance at September 30, 2008 6

4. a) Review Maslow's hierarchy of needs. Do you agree with the particular ranking of employee needs? Why or why not? 5
- b) Discuss the various types of leadership styles with proper examples. 5
- c) What is a worksheet? Explain the purpose of the worksheet. 5

- ✓5. a) Who has given the 14 PRINCIPLES OF MANAGEMENT, and who is he? Describe the principles with pertinent examples? 10
- b) What is Span of Control? Describe the factors affecting the width of the Span of Control. 5

- ✓6. a) According to Mintzberg, managers play some roles, what are these, Discuss in short. 10
- b) Describe the approaches to establishing goals. 5



**Jahangirnagar University**  
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3<sup>rd</sup> Year 2<sup>nd</sup> Semester B.Sc. (Hons.) Examination 2022

Course Title: **Human Computer Interaction**  
Time: 3 hours

Course No: **CSE 353**  
Full Marks: **60**

[Answer each of the following questions. Each question carries equal marks. Figures in the right margin indicate marks.]

1.

Question No. 1 will be based on **COI**.

Answer **All of them**.

- a) Why Human-computer interaction is important in software design? 2
- b) Write the key elements that is used in ubiquitous computing. 2
- c) List out the core characteristics of user-centered design. 2
- d) Differentiate between mockups and prototypes. 2
- e) Write the benefits of Model View Controller. 2
- f) Define a Petrinets with an example. 2

2.

Question No. 2 will be based on **CO2**.

Answer **Any Three out of Four**.

- a) Discuss the importance of human characteristics which should be considered in interface design. 4
- b) Explain the seven stages of Donald Norman's Model of Interaction. 4
- c) Describe the guidelines for data display and data entry. 4
- d) Write the reason for using Paradigms of Interaction? Explain Networking and Graphical Display Unit paradigms for interaction. 4

9

36  
37  
~~A3~~

3.

Question No. 3 will be based on **CO3**.

Answer **Any Three** out of **Four**.

- a) Explain Wire-Framing techniques. Write details about the components that is used in Wire-Framing techniques. 4
- b) Write the techniques used for Goal and Task Hierarchies model. Explain the execution steps of Hierarchical Task Analysis. 4
- c) Classify the types of Scenario and write the reason of using Scenario. 4
- d) Briefly define four different interaction styles used to accommodate the dialog between user and computer. 4



Question No. 4 will be based on **CO4**.

Answer **Any Three** out of **Four**.

- a) Differentiate between Virtual Reality and Augmented Reality. Write some application of Augmented Reality. 4
- b) Illustrate the basic concept of User Interface Management System. Discuss about the Seeheim Model Architecture. 4
- c) Point out the evaluation criteria that is used in Evaluation Techniques. Explain Heuristic evaluation techniques through expert analysis. 4
- d) Illustrate Pervasive Computing and Ambient Intelligence Computing technology. 4



Question No. 5 will be based on **CO5**.

Answer **Any Two** out of **Three**.

- a) What is prototyping? Describe some of the techniques that are available for producing rapid prototypes. 6
- b) Compare between Low Fidelity and High Fidelity Prototyping Techniques. Describe Computer Mediated Communication. 6
- c) Describe the elements of Multimedia that we use in our day to day life. Also write some advantages of Multimedia. 6



**Jahangirnagar University**  
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3<sup>rd</sup> Year 2<sup>nd</sup> Semester B.Sc. (Hons.) Final Examination – 2022

Course Title: Microprocessors  
Time: 3.00 hours

Time: 3.00 hours

Course No: CSE-357  
Full Marks: 60

[Answer each of the following questions. Each question carries equal marks. Figures in the right margin indicate marks.]

Question No. 1 will be based on *COJ*. Answer *All of them*.

- |    |  |   |
|----|--|---|
| 1. | a) Define RISC microprocessors.  | 2 |
|    | b) What are the basic differences between accumulator based microprocessor and general purpose microprocessor? | 2 |
|    | c) Mention some features of Pentium processor.   | 2 |
|    | d) Define the function of the registers: AX, BX, CX, and DX.   | 2 |
|    | e) What is the difference between the 80286 real address mode and protected virtual address mode?              | 2 |
|    | f) Define and state the purpose of interrupts.   | 2 |

Question No. 2 will be based on **CO<sub>2</sub>**. This question will be consisting of **Four** Sections.

**Answer *Any Three* out of Four.**

2. a) Discuss Full/Partial decoding technique for designing the main memory. 4

b) Draw the flag registers of 8086 microprocessor and state the function of each bit. 4

c) Illustrate the 8251A modem connection for both asynchronous and synchronous communication. 4

d) Draw the block diagram of 8237 DMA controller along with associated logic and explain its role as a slave and master. 4

Question No. 3 will be based on **CO3**. This question will be consisting of **Four Sections**.  
Answer **Any Three** out of Four.

**Answer Any Three out of Four.**

3. a) Discuss basic static RAM organization and its operation.  
b) Briefly describe the principle criteria involved in designing a memory.

- c) Draw a typical interface circuit to interface an  $8 \times 8$  keypad and 8-digit display with 8279 and explain how it works. 4
- d) Describe briefly asynchronous and synchronous serial communication. 4

Question No. 4 will be based on **CO4**. This question will be consisting of **Four Sections**.

Answer **Any Three out of Four**.

4. a) 4
- i) Point out some features of INTEL 80286 microprocessors.
- ii) Show the internal architecture of Pentium processors.
- b) Explain with necessary figure how INTEL 80286 microprocessor translates logical address to physical address. 4
- c) Explain briefly the 80286 protection mechanism. 4
- d) Write short notes on memory addressing modes of 80386 microprocessors. 4

Question No. 5 will be based on **CO5**. This question will be consisting of **Three Sections**.

Answer **Any Two out of Three**.

5. a) Describe the operation that an 8086 will perform when it executes each of the following instructions: 6
- i) *MOV BX, 03FFH*
- ii) *MOV AL, 0DBH*
- iii) *MOV DH, CL*
- iv) *MOV BX, AX*
- b) Construct a  $4K \times 8$  RAM using  $1K \times 1$  RAM chips. 6
- c) Determine the addressing modes of the following instructions: 6
- i) *MOV CH, 8*
- ii) *MOV AX, DS: START*
- iii) *MOV [SI], AL*
- iv) *MOV SI, BYTEPTR[BP + 2] [DI]*
- v) *MOV EAX, [EBX \* 4]*
- vi) *ADD AH, [EBX + 35] [ESI]*



**Jahangirnagar University**  
Department of Computer Science and Engineering  
Third Year Second Semester B.Sc. (Hons.) Final Examination -2022

Course Title: Computer Networks  
Time: 3 Hours

Course No: CSE-359  
Full Marks: 60 -

[Answer each of the following questions. Each question carries equal marks. Figures in the right margin indicate marks.]

*C1.* Question No. 1 based on **CO1**. Answer all of them.

- a) Mention two basic functions of physical layer of OSI? 2
- b) Give the concept of asynchronous and transfer mode of ATM. 2
- c) Compare ARQ and FEC. 2
- d) Explain the difference between persistent HTTP connections and non-persistent HTTP connections. 2
- e) Write down some of the best characteristics of User Datagram Protocol (UDP). 2
- f) Compare physical and logical congestion of a network. 2

*C2.* Question No. 2 based on **CO2**. Answer Any three out of four.

- a) (i) Why 'Sliding Window Flow Control' is preferable compared to 'Stop-and-Wait Flow Control'. 2  
(ii) Compare exhaustive service, gated service and limited service of token ring network. 2
- ~~b)~~ Compare leaky and token bucket algorithm in traffic shaping. The capacity of the token bucket  $C = 250\text{KB}$ , token arrival rate  $\rho = 2\text{MB/sec}$  and the maximum drain rate  $M = 25\text{MB/sec}$ . (i) Determine the duration of high and low rate, assuming the burst data of 1MB (ii) Repeat the work for  $C = 750\text{KB}$  and comment on the result. 4
- c) (i) Give the steps of determination of IP address against a DNS. 2  
(ii) How the communication link between two IPv6 routers having several intermediate IPv4 routers can be solved using tunneling? 2
- ~~d)~~ (i) Why smaller frame is preferred in Computer Network? Under which condition 'stop and wait protocol' works efficiently? 2  
(ii) What is the best case and worst case of 'byte stuffing' and 'bit stuffing' technique of framing? 2

Question No. 3 is based on **CO3**. Answer Any three out of four.

3.

- a) An information source generates message bit string,  $M = 1\ 1\ 0\ 0\ 1\ 1$  (6 bits); Generator bit string,  $G = 1\ 0\ 1$  (3 bits); i) Determine the polynomials:  $R(x)$  and  $T(x)$  ii) Transmitted sequence of frame (iii) determine error polynomial for two bit error (you can choice the bits of any portion) (iv) how to avoid ambiguity of odd number of bit error? 4
- b) (i) Compare asymmetric and symmetric release of end to end connection of transport layer. 3  
What is the problem of asymmetric release in computer network? Give your opinion about its remedial measure.

(ii) Show slow start, additive increase and multiplicative decrease operations of TCP Tahoe graphically (only the graph).

✓ (i) What do you mean by records: 'www.ait.ac.th 86400 IN A 192.168.30.44' and 'ait.ac.th 86400 IN MX javed.ait.ac.th' under DNS server?

(ii) What are the phases of POP3 protocol between user and mail box?

C✓ d) (i) Why Web Caching is used in a browser? Give process of Web Caching.

(ii) Can you provide security at any layer of OSI model? Give your opinion with example. How firewall works at application layer?

4.

Question No. 4 is based on **CO4**. Answer *Any three*.

✓ a) Compare substitution and transposition cipher? How can you distinguish these two types cipher from the encrypted English text? Taking  $p = 2$  and  $q = 7$  determine all the parameters of RSA then verify encryption and decryption of the plain text P = 3.

✓ b) Give the properties of message digest. Show the arrangement SHA-1 algorithm in implementation of digital signature. Compare digital and handwritten signature in context of Inclusion, Verification and Relationship.

c) (i) Show the statistical multiplexing technique of ATM with diagram. Give the conceptual view of VP and VC switch of ATM with routing table.

(ii) What is the function of Convergence sub-layer of ATM?

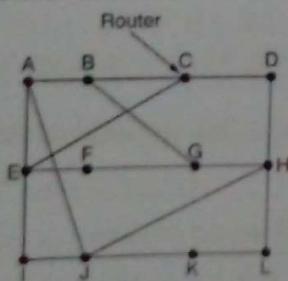
d) (i) What is error control?

(ii) Suppose a message M = 11100. Find the transmitted code and correct the received code when there is an error using Hamming method with even parity.

5.

Question No. 5 is based on **CO5**. Answer *Any two*.

a) Explain count to infinity problem of distance vector routing with example. If the new delay of links associated with node J of fig. below is, JA=13ms, JI=9ms, JH=4ms and JK= 15ms then determine the new delay of (i) J to F (ii) J to G (iii) J to D using help of following routing table under distance vector routing algorithm.



To	A	I	H	K
A	0	24	20	21
B	12	36	31	28
C	25	18	19	36
D	40	27	8	24
E	14	7	30	22
F	23	20	15	40
G	16	31	6	31
H	17	20	0	19
I	21	0	14	22
J	9	11	7	10
K	24	22	22	0
L	29	33	9	9

b) (i) Derive the expression of maximum carried traffic of slotted ALOHA. A slotted ALOHA system uses 200 kbps channel where on an average each terminal generates frame of 200 bits. Each user on average transmits 50 frames per second. How many terminals the system can accommodate? Repeat the job for the size of frame of 100 bits. Comment on the result.

- (ii) An organization is granted a block of addresses with the beginning address 14.24.74.0/24. The organization needs to have 3 subblocks of addresses to use in its three subnets; one subblock of 9 addresses, one subblock of 40 addresses, and one subblock of 30 addresses. Design the subblocks. 2

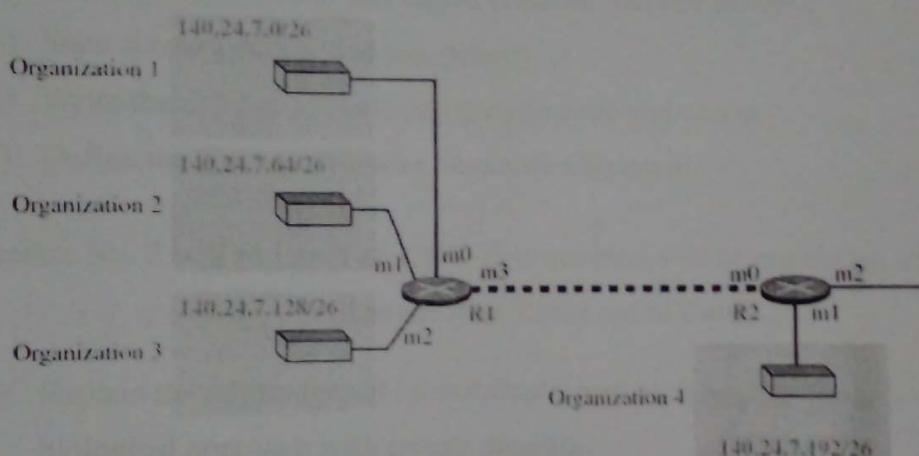
**First subnet:**

Subnet mask	# of allocated addresses	First address (in dotted decimal)	Last address (in dotted decimal)

**Second subnet:**

Subnet mask	# of allocated addresses	First address (in dotted decimal)	Last address (in dotted decimal)

- c) For the following figure, answer the questions below: 6



- (i) Fill the routing tables for R1

Network Address/mask	Next-hop address	Interface

- (ii) Fill the routing tables for R2

Network Address/mask	Next-hop address	Interface

- (iii) Suppose a packet arrives at router R2 with destination address 140.24.7.123. How will R2 route the packet. Show all your work for full marks.



**Jahangirnagar University**  
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3<sup>rd</sup> Year 2<sup>nd</sup> Semester B.Sc. (Hons.) Final Examination – 2022

Course Title: Introduction to Bioinformatics  
Time: 3.00 hours

Course No: CSE-355  
Full Marks: 60

[Answer each of the following questions. Each question carries equal marks. Figures in the right margin indicate marks.]

Question No. 1 will be based on **CO1**. Answer **All of them**.

1. a) Define bioinformatics. Mention the work of three important persons involved in bioinformatics. 2
- b) Mention a brief note on Phylogenetic Memory. 2
- c) Define Markov chain and HMM (Hidden Markov Model). 2
- d) State scoring matrix and gap penalty. 2
- e) Write the differences between genetic code and codon. 2
- f) Define the concept Pairwise Sequence alignment. 2

Question No. 2 will be based on **CO2**. This question will be consisting of **Four Sections**.

Answer **Any Three** out of Four.

2. a) Explain the advantages of bioinformatic approach to drug design over conventional biological approach with proper diagram. 4

b) Figure out the biological significance of gaps in the evolution and calculation of score in an alignment of two amino acid sequences. 4

c) Interpret the meaning of following substitution scoring matrices:  
**PAM 2, PAM 15, PAM 80, BLOSUM 62 and BLOSUM 90.** 4

Identify the matrices among these that should be used for the alignment of two evolutionarily divergent protein sequences.

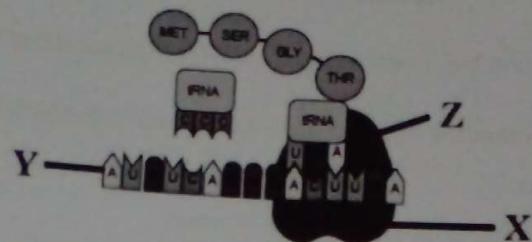
- d) Draw and describe a cladogram for the following organisms V, W, X, Y and Z given the table of traits: 4

Species	1	2	3	4	5
V	+	+	-	-	-
W	+	+	+	-	-
X	-	-	-	-	-
Y	+	-	-	-	-
Z	+	-	-	+	+

Question No. 3 will be based on CO3. This question will be consisting of **Four** Sections.

Answer **Any Three** out of **Four**.

3. a) Answer the following questions considering the diagram shown as: 4

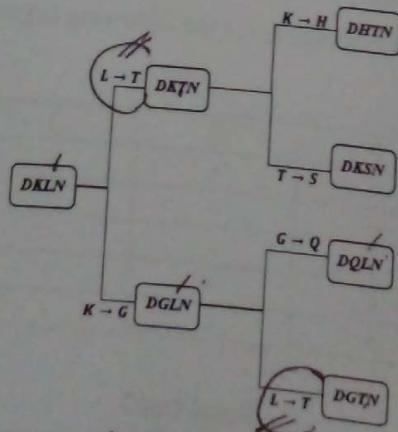


- Illustrate the process depicted in the diagram for the first two codons.
  - Identify the X, Y and Z component and describe their functions.
  - Draw the double helix DNA structure of the hypothetical gene represented by Y.
- b) Consider the following coding strand DNA sequence of the hypothetical color producing gene in some eukaryotic cell of an organism. [use the codon table provided at the end] 4

	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5	6	7	8	9	0	1	2	3
DNA	T	A	C	G	C	T	T	C	G	A	A	G	C	T	C	A	A	C	G	G	C	A	C	T
mRNA																								
Amino acid sequence																								

After the nitrogenous base at *position 5* being mutated to nitrogenous base A, investigate the impact on the nature of the protein.

c) Consider the following phylogenetic tree generated from the multiple sequence alignment of seven different sequences: 4



Discover the substitution score in the PAM matrix (partial) if L is replaced with T.

d) Calculate linear gap penalty and affine gap penalty from the following 4 alignments:

t	a	c	g	t	g	-	-	a	g	g	t
t	a	c	a	t	g	c	t	a	g	g	t

Gap opening penalty = 5

Gap extension penalty = -1

Scoring matrix

	a	c	g	t
a	(3)	-3	-1	-3
c	-3	(3)	-3	-1
g	-1	-3	(3)	-4
t	-3	-1	-4	(3)

Question No. 4 will be based on **CO4**. This question will be consisting of **Four** Sections.

Answer **Any Three** out of **Four**.

4. a) Given a part of protein sequences of five different organisms is given as:

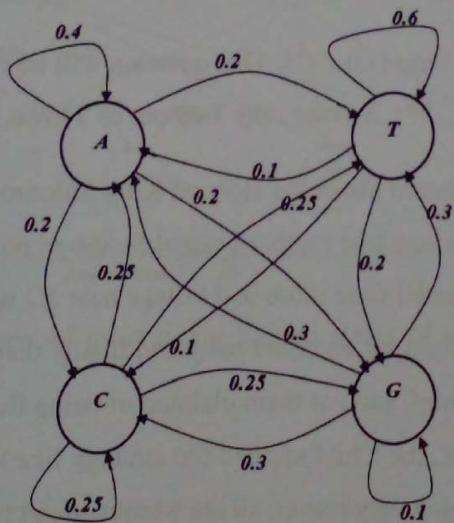
4

Sequence	Amino Acids		
$S_1$	K	P	T
$S_2$	K	P	V
$S_3$	V	P	A
$S_4$	T	P	V
$S_5$	T	P	K

Construct a BLOSUM matrix.

- b) A Markov chain of four nucleotide bases is depicted as:

4



Predict the probability that at a particular site, the nucleotide base will be first G, then A, then G, then T and then G through mutation consecutively.

- c) Write the Needleman-Wunch algorithm for solving global alignment problem. 4

Given two protein sequences (part of protein sequences) as:

**X:** AATTCGCGTA

**Y:** TATCGCTACA

Gap penalty = -4

Similarity matrix:

	A	C	G	T
A	5	-3	-3	-3
C	-3	5	-3	-3
G	-3	-3	5	-3
T	-3	-3	-3	5

- i. Build the complete dynamic programming table for these sequences.

- ii. Figure out the edit distance between **X** and **Y** and list out all optimal global alignment between them.

- d) Align two sequences shown below using Smith-Waterman algorithm. Use match 4 score of 4, mismatch score of -4 and gap penalty score of 2.

Sequence 1: AGAGCTCACAA	Sequence 2: AGTAGCTTCCAAA
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Analyze:

- i. dynamic programming matrix with scores
- ii. track back pointers
- iii. total score

Question No. 5 will be based on **CO5**. This question will be consisting of **Three** Sections.

Answer **Any Two** out of **Three**.

5. a) You must have heard about the story of King Solomon and two mothers claiming 6 an infant baby where true mother begged Solomon not to cut the baby. Right!

History has repeated once more in a village near JU where there lived five woman and they had a fight for an infant baby and finally they decided to go to the village Chief. To the Chief, each of them claimed of being the true mother of the baby. To resolve the issue, the Chief applied the strategy like king Solomon and ordered to cut the baby. Being very clever, all the woman urged to the chief not to kill the baby as they also knew the story of Solomon. Hence, the chief was in a fix what to do now! The chief came to know that you are a bioinformatician and asked for your help to find out the true mother.

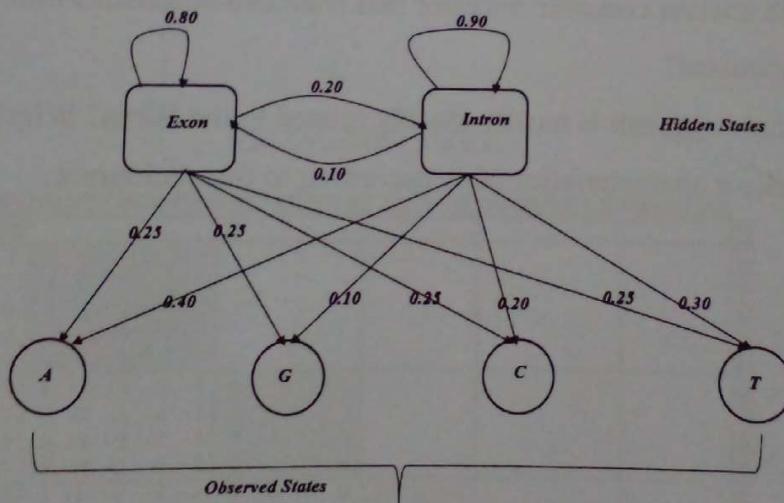
**Partial DNA sequences of the women and the baby**

Baby: ATCCTGGTACTG  
 Woman-1: CCGGAGAAGTAG  
 Woman-2: AACGTGCTACTG  
 Woman-3: ATGGTGAAAGTG  
 Woman-4: CCGGAAAACTTG  
 Woman-5: TGGCCCTGTATC

Evolutionary Distance Matrix						
	B	W1	W2	W3	W4	W5
B		9	2	4	9	10
W1			9	6	9	10
W2				5	9	10
W3					6	10
W4						10
W5						

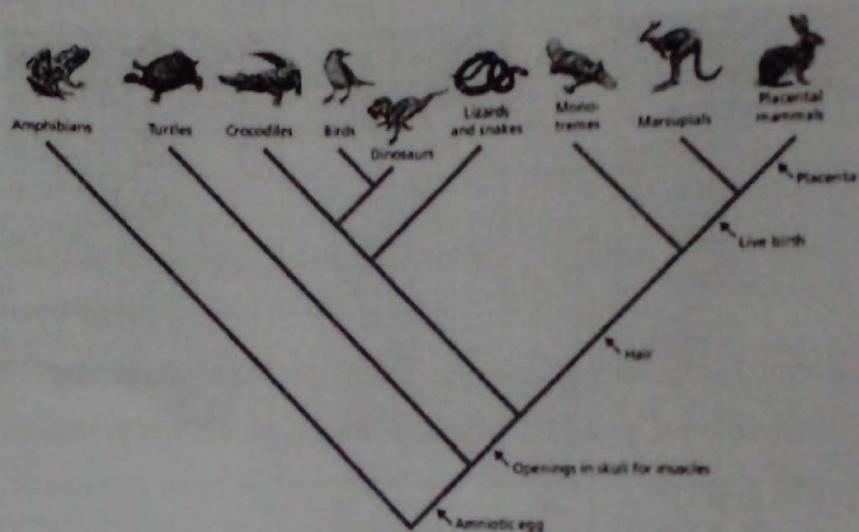
You must remember that the chief does not understand any mathematical representation of proof but graphical one. Assume that evolution follows molecular clock hypothesis.

- b) Suppose, a gene finding problem is modeled using Hidden Markov Model as 6 depicted in the below diagram.



Estimate the sequence of most likely hidden states of the following sequence:  
**GCACT**

- c) Evaluate and write your opinion from the following questions in the given cladogram:



- Label the outgroup and ingroup.
- The ancient common ancestor had what characteristics that is shared by all organisms?
- What organism is mostly closely related to the Birds? Why?
- Make a characteristics table according to the cladogram.

## Attachment

Codon Table

UUU } UUC } Phe UUA } UUG }	Leu	UCU } UCC } Ser UCA } UCG }	UAU } UAC } Tyr UAA } UAG }	Stop	UGU } UGC } Cys UGA Stop UGG Trp
CUU } CUC } CUA } Leu CUG }		CCU } CCC } CCA } Pro CCG }	CAU } CAC } His CAA } CAG }	Gln	CGU } CGC } CGA } Arg CGG }
AUU } AUC } Ile AUA } AUG Met		ACU } ACC } ACA } Thr ACG }	AAU } AAC } Asn AAA } AAG }	Lys	AGU } AGC } Ser AGA } AGG } Arg
GUU } GUC } Val GUA } GUG }		GCU } GCC } GCA } Ala GCG }	GAU } GAC } Asp GAA } GAG }	Glu	GGU } GGC } GGA } Gly GGG }

BLOSUM62 Matrix

C	S	T	A	G	P	D	E	Q	N	H	R	K	M	I	L	V	W	Y	F		
C 9																			C		
S -1	4																		S		
T -1	1	5																	T		
A 0	1	0	4																A		
G -3	0	-2	0	6															G		
P -3	-1	-1	-1	-2	7														P		
D -3	0	-1	-2	-1	-1	6													D		
E -4	0	-1	-1	-2	-1	2	5												E		
Q -3	0	-1	-1	-2	-1	0	2	5											Q		
M -3	1	0	-2	0	-2	1	0	0	6										M		
H -3	-1	-2	-2	-2	-2	-1	0	0	1	8									H		
R -3	-1	-1	-1	-2	-2	-2	0	1	0	0	5								R		
K -3	0	-1	-1	-2	-1	-1	1	1	0	-1	2	5							K		
M -1	-1	-1	-1	-3	-2	-3	-2	0	-2	-2	-1	-1	5						M		
I -1	-2	-1	-1	-4	-3	-3	-3	-3	-3	-3	-3	1	4						I		
L -1	-2	-1	-1	-4	-3	-4	-3	-2	-3	-3	-2	-2	2	2	4				L		
V -1	-2	0	0	-3	-2	-3	-2	-2	-3	-3	-2	1	3	1	4				V		
W -2	-3	-2	-3	-2	-4	-4	-3	-2	-4	-2	-3	-3	-1	-3	-2	-3	11		W		
Y -2	-2	-2	-2	-3	-3	-3	-2	-1	-2	2	-2	-2	-1	-1	-1	-1	2	7		Y	
F -2	-2	-2	-2	-3	-4	-3	-3	-3	-3	-1	-3	-3	0	0	0	-1	1	3	6		F
	C	S	T	A	G	P	D	E	Q	N	H	R	K	M	I	L	V	W	Y	F	